Annual Benchmark Report for Wholesale Trade: January 1992 Through March 2001

COVERAGE

This publication provides estimates of monthly and annual sales and end-of-month non-LIFO (last-in, first-out) inventories for merchant wholesalers in the United States. Merchant wholesalers represent companies taking title to goods bought for resale to other businesses, and excludes sales branches, agents, and brokers selling on a commission basis. Annual purchases and gross margin estimates are also provided. The estimates are presented at kind-of-business levels defined by the North American Industry Classification System (NAICS).

Previously, the U.S. Census Bureau maintained time series of monthly sales and end-of-month inventory estimates of merchant wholesalers based on the Standard Industrial Classification (SIC) system. The SIC-based time series ended with the March 2001 reference month. Merchant wholesale estimates published in all reports subsequent to this report will be on a NAICS basis.

For this report, the SIC-based monthly and annual estimates have been revised to a NAICS basis beginning with January 1992. Data prior to January 1992 were not restated on a NAICS basis, and are not comparable to the data in this report. A summary of changes from the prior benchmark report and the procedures for revising the SIC-based estimates are described below.

SUMMARY OF CHANGES

New samples were introduced with the 1999 Annual Trade Survey (ATS) and with the March 2001 Monthly Wholesale Trade Survey (MWTS). The new samples are designed to produce estimates based on the North American Industry Classification System (NAICS) and replace samples designed to produce estimates based on the Standard Industrial Classification (SIC) system.

Previously published estimates of monthly sales and end-of-month inventories for January 1992 through March 2001, as well as estimates of annual sales, purchases, and end-of-year inventories for 1992 through 1998, were restated from an SIC basis to a NAICS basis. These restated estimates were input to the benchmarking program to revise the data. The benchmarking reflects results of the 1999 ATS and the 1997 Census of Wholesale Trade.

New factors, used to adjust sales estimates for seasonal and trading-day variations, were developed and used to adjust the revised estimates for January 1992 through March 2001. New factors were also developed and used to adjust the revised inventory estimates for the same period.

DERIVATION OF PUBLISHED ESTIMATES

The monthly and annual estimates provided in this report were developed by restating the SIC-based estimates for 1992 through March 2001 on a NAICS basis and then applying a sequence of benchmarking procedures to the restated estimates. Before the benchmarking procedures were implemented, we restated the 1992 Economic Census sales totals to a NAICS basis, restated the SIC-based sample estimates to a NAICS basis, and derived the 1992 and 1997 purchases and end-of-year inventory estimates on a NAICS basis.

DERIVATION OF ESTIMATES REQUIRED FOR BENCHMARKING

To obtain the 1992 Economic Census sales on a NAICS basis, the SIC code of each establishment in the 1992 census was converted to a NAICS code. First, each establishment with an SIC code related to only one NAICS code, was assigned that NAICS code. Remaining establishments that matched to the 1997 Census of Wholesale Trade by their identification number and SIC were assigned the NAICS codes assigned to them in the 1997 census. All other 1992 census establishments were randomly assigned a NAICS code using a probabilistic model. The model was based on relationships between SIC and NAICS code assignments in the 1997 census. After the classification code conversion, the 1992 census data was retabulated on a NAICS basis.

To restate the monthly and annual estimates on a NAICS basis, we first distributed estimates for each SIC code to its corresponding NAICS code(s). When a NAICS code consisted of more than one SIC component, the distributed estimates from each SIC component were summed to give the restated NAICS estimate. Distributions for all data items were based on those observed in the 1997 Economic Census for sales.

To complete the restatement of the monthly sales estimates, we multiplied the monthly NAICS estimates prior to March 2001 by a geometric mean. The geometric mean links the monthly NAICS estimates derived from the SIC-based samples to estimates derived from the new NAICS-based samples. The geometric mean is computed as the square root of the product of two ratios. The numerators of the ratios are the February and March 2001 NAICS sales estimates derived from the newly introduced NAICS-based samples. The denominators of the ratios are the February and March 2001 NAICS sales estimates derived from the SIC-based samples. We did the same procedure for end-of-month inventories.

To derive the 1992 and 1997 purchases and inventory estimates needed for the benchmarking process, we multiplied the NAICS census sales totals for 1992 and 1997 by ratios of the inventory-to-sales and purchases-to-sales computed from the restated annual estimates for the corresponding reference years.

COMPUTATION OF BENCHMARKED ESTIMATES

Annual Estimates

Restated estimates derived from the annual surveys were benchmarked to sales totals obtained from the 1992 and 1997 Censuses of Wholesale Trade. [1] The benchmarking revised the restated estimates of annual sales, end-of-year inventories, and annual purchases for 1992 through 1998 in a manner which

- constrained the 1992 and 1997 annual estimates to the NAICS results derived from the 1992 and 1997 Censuses of Wholesale Trade, [2] and

- minimized the difference between the year-to-year changes of the restated annual estimates (input series) and the revised estimates (output series).

One final adjustment was made to derive the published end-of-year inventory and purchases estimates for 1992 through 1998. First, the 1998 published end-of-year inventory was set to the benchmarked 1998 annual sales estimate multiplied by the 1998 inventory-to-sales ratio estimated from the 1999 ATS. Then, to derive the published estimates for 1992 through 1997, each of the benchmarked end-of-year inventory estimates was multiplied by the ratio of the published to benchmarked estimates of 1998 end-of-year inventory. A similar adjustment was made for purchases.

Estimates of annual sales, end-of-year inventories, and annual purchases for 1999 were computed by multiplying the published 1998 estimates by the ratio of the 1999-to-1998 estimates derived from the 1999 Annual Trade Survey.

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[1] Estimates for NAICS code 4215 were not benchmarked to census levels. The estimates were derived directly from the annual surveys. The section entitled, "Classification Differences Between Monthly Survey and 1997 Census of Wholesale Trade" discusses why estimates were not benchmarked to census results.

[2] Because census inventory estimates do not reflect inventories of auxiliary and central administrative offices of merchant wholesalers, the 1992 and 1997 restated inventory estimates were used.

Published estimates of annual sales, end-of-year inventories, and annual purchases were derived at detailed kind-of-business levels (usually defined by 4-digit North American Industry Classification System codes). Summary totals were derived by summing the estimates for corresponding detailed levels.

Estimates of Monthly Sales

For January 1992 through March 2001, restated estimates of monthly sales were changed in a manner which

- constrained the sum of the 12 monthly sales estimates for a particular year to equal the benchmarked, restated annual sales estimates derived for the years 1992 through 1999 and

- minimized the difference between the month-to-month changes of the restated monthly estimates (input series) and the benchmarked monthly estimates (output series).

A mathematical result of the benchmarking methodology is that all input estimates following the end of the last benchmark year (1999) are derived by multiplying these estimates by the ratio of benchmarked-to-input estimate for the last month of the last benchmark year (1999). Therefore, for a specified sales series, a ratio of the December 1999 benchmarked estimate to the December 1999 restated, input estimate was computed. Estimates for periods following December 1999 were multiplied by these constant ratios (called carry-forward factors) to derive published sales estimates. The carry-forward factors remain constant until the next benchmarking operation.

Estimates of End-of-Month Inventories

For January 1992 through March 2001, restated end-of-month inventory estimates were changed in a manner which

- constrained the end-of-year inventory estimates (derived from the monthly survey) for 1992 through 1999 to the published end-of-year inventory estimates derived from the annual survey, and

- minimized the difference between month-to-month changes of the restated estimates (input series) and the published estimates (output series).

Estimates subsequent to December 1999 were derived by multiplying the restated estimates by the ratio of the December 1999 published estimate to the restated estimate for December 1999. This ratio is the carry-forward factor for inventory and remains constant for all series until the next benchmarking operation.

Dollar Values

All dollar values presented are expressed in current dollars; that is, the estimates are not adjusted to a constant dollar series. Consequently, when comparing estimates to prior years, users also should consider price level changes.

Title 13, United States Code

Title 13 of the United States Code authorizes the Census Bureau to conduct censuses and surveys. Section 9 of the same Title requires that any information collected under the authority of Title 13 be maintained as confidential. In accordance with this law governing Census Bureau reports, no estimates are published that would disclose the operations of an individual firm.

Disclosure Limitation

Disclosure limitation is the process used to protect the confidentiality of the survey data provided by an individual firm. In accordance with Federal law governing Census Bureau reports, no estimates are published that would disclose the operations of an individual firm.

Unpublished Data

Sales and inventory estimates for five-digit wholesale trade categories are not included in this publication because high sampling variability, poor response, or other factors may make them potentially misleading. Upon written request, for a nominal fee the Census Bureau will release these estimates for individual use, though not for publication.

CAVEATS

Data before March 2001 should be used with caution.

We expect that for estimates for NAICS codes that, by definition, are the same or nearly the same as a given SIC, the quality of the data will be similar to that of data released on an SIC basis. Note, however, that historical data for these series will differ from previously published numbers due to using results from the new NAICS-based samples in the benchmarking process.

Data will be of much less quality for series with NAICS codes that consist of more than one SIC component.

We expect estimates from January 1992 to December 1996 to be less accurate than estimates for later periods and that the earlier the period, the less accurate the results. The data developed for the January 1992 to December 1996 period depended more heavily on the conversion of SIC-based data to a NAICS basis than did data for later periods.

While data for January 1997 through March 2001 also depended on SIC-based data being converted to a NAICS basis, data collected on a NAICS basis were available for benchmarking the data for that period. Note, however, that trends for that period are dependent on the underlying SIC-based trends.

SAMPLE DESIGN AND ESTIMATION PROCEDURES

INTRODUCTION

The U.S. Census Bureau produces the *Annual Benchmark Report for Wholesale Trade* to provide national estimates of

- annual sales and
- end-of-year inventories

of merchant wholesale establishments by kind of business.

We develop the sales and inventory estimates in this report from probability samples that represent employer firms of all sizes and kinds of business that are merchant wholesalers throughout the nation.

SAMPLE DESIGN

New samples were introduced with the 1999 Annual Trade Survey (ATS) and with the March 2001 Monthly Wholesale Trade Survey (MWTS). The new samples are designed to produce estimates based on the North American Industry Classification System (NAICS) and replace samples designed to produce estimates based on the Standard Industrial Classification (SIC) system. For January 2001 through March 2001, we requested data from both the prior and new samples. We used this data to link the estimates from the two samples. This section describes the design, selection, and estimation procedures for the new samples. For descriptions of the prior samples see the *Annual Benchmark Report for Wholesale Trade for January 1990 to February 2000* or prior benchmark reports.

Sampling Frame

The sampling frame for the Monthly Wholesale Trade Survey and the Annual Trade Survey has two types of sampling units represented -- Employer Identification Numbers (EINs) and large, multiple-establishment firms. Both sampling units represent clusters of one or more establishments owned or controlled by the same firm. The information used to create these sampling units was extracted from data collected as part of the 1997 Economic Census and from establishment records contained on the Census Bureau's Business Register as updated to June 1999. The next few paragraphs give details about the Business Register; the distinction between

firms, EINs, and establishments; and the construction of the sampling units. Though important, they are not essential to understanding the basic sample design and readers may continue to the **Stratification, Sampling Rates, and Allocation** section.

The Business Register is a multi-relational database that contains a record for each establishment with employees. The establishment is the smallest entity represented on the Business Register. An *establishment* is a single physical location where business transactions take place and for which payroll and employment records are kept. Groups of one or more establishments under common ownership or control are *firms*. A *singleunit* firm owns or operates only one establishment. A *multiunit* firm owns or operates two or more establishments. The treatment of establishments on the Business Register differs according to whether the establishment is part of a multiunit or singleunit firm. In particular, the structure of an establishment's primary identifier on the Business Register differs depending on whether it is owned by a *singleunit* firm or by a *multiunit* firm.

A singleunit firm's primary identifier is its Employer Identification Number (EIN). The Internal Revenue Service issues the EIN and the firm uses it as an identifier to report social security payments for its employees under the Federal Insurance Contributions Act (FICA). The same act requires all employer firms to use EINs. Because singleunit firms have only one establishment, there is a one-to-one relationship between the firm and the EIN. Thus the firm, the EIN, and the establishment all reference the same physical location and all three terms can be used interchangeably and unambiguously when referring to single establishment firms.

For multiunit firms however, a different structure connects an employer firm with its establishments via the EIN. Essentially a multiunit firm is associated with a cluster of one or more EINs and EINs are associated with one or more establishments. A multiunit firm consists of at least two establishments. Each firm is associated with at least one EIN and only one firm can use a given EIN. However, one multiunit firm may have several EINs. Similarly, there is a one-to-many relationship between EINs and establishments. Each EIN can be associated with many establishments but each establishment is associated with only one EIN. Because of the possibility of one-to-many relationships, we must distinguish between the firm, its EINs, and its establishments. The firm that owns or controls a multiunit establishment is identified on the Business Register by way of the establishment's primary identifier.

A multiunit establishment's primary identifier consists of a unique combination of an alpha number and a plant number. The alpha number identifies the firm and the plant number identifies a particular establishment within the firm. All establishments owned or controlled by the same multiunit firm have the same alpha number. Different multiunit firms have different alpha numbers and different establishments within the same multiunit firm have different plant numbers. The Census Bureau assigns both the alpha number to the multiunit firm and the plant numbers to the corresponding establishments based on the results of the quinquennial Economic Censuses and the annual Company Organization Survey.

To create the sampling frame, we extract the records for all establishments classified as merchants within the Wholesale Trade sector as defined by the 1997 North American Industry Classification System. For these establishments, we extract sales, payroll, employment, inventory, name and address information, as well as primary identifiers and, for establishments owned by multiunit firms, associated EINs. We summarize the economic data of multiunit establishments to an EIN level by tabulating the establishment data for all merchant wholesaler establishments associated with the same EIN. Similarly we summarize to a multiunit firm level by tabulating the establishment data for all establishments associated with the same alpha number. These are the sampling units created from multiunit establishments. No aggregation is necessary to put singleunit establishment information on an EIN basis or a firm basis. Thus, the sampling units created for singleunit firms simultaneously represent establishment, EIN, and firm information. In summary, the sampling frame is a complex amalgam of establishments, EINs, and firms.

Stratification, Sampling Rates, and Allocation

The primary stratification of the frame is by kind-of-business group based on the detail required for this publication. We further stratify the sampling units within kind of business groups (substratify) by a measure of size related to their sales. To reduce the variance of the estimates, the largest sampling units are selected "with certainty." This means they are sure to be selected and will represent only themselves (i.e., have a selection probability of one and a sampling weight of one). Within each kind of business stratum a substratum boundary (or cutoff) that divides the certainty units from the noncertainty units is determined. We based these cutoffs on a statistical analysis of data from the 1997 Census of Wholesale Trade. Accordingly, these values are on a 1997 sales (or inventory) basis. We also used this analysis to set sampling rates needed to achieve specified sampling variability objectives for sales (or inventory) estimates for different kind-of-business groups. Note that we computed sampling rates using data from the 1997 Census. The actual sample size was determined by applying these sampling rates to the sampling frame constructed from the June 1999 Business Register. We then allocated the sample optimally based on the number of sampling units and standard deviation of the units' measures of size. The allocation is optimal in the sense that it achieves the minimum variance for a fixed sample size.

Sample Selection

The first step in the sample selection identified certainty firms. If a firm had total merchant wholesale sales or inventories (for 1998 adjusted to a 1997 basis) greater than the corresponding certainty cutoff for its major kind of business, the firm was selected into the sample with certainty. In this case, the firm is considered the sampling unit. This has important consequences when the firm adds establishments. If a firm was selected with certainty and had more than one establishment at the time of sampling, any new establishments that the firm acquires, even if under new or different EINs, are included in the sample with certainty. However, if a singleunit firm was selected with certainty, only future establishments associated

with that firm's originally-selected EIN are included in the sample with certainty; any new EINs that might later be associated with that firm are subjected to sampling through the quarterly birth-selection procedure (see **Sample Maintenance**).

All firms not selected with certainty were subjected to sampling on an EIN basis. If a firm had more than one EIN, we treated each of its EINs as a separate sampling unit. To be eligible for the initial sampling, an EIN used by a singleunit firm had to have nonzero payroll in 1998. EINs used by multiunit firms were required to have nonzero payroll in 1997. The EINs were stratified according to their major kind of business and their estimated sales (on a 1997 basis). Within each noncertainty stratum, a simple random sample of EINs was selected. We then assigned the selected noncertainty EINs to one of two groups. One group is canvassed for both the monthly and annual surveys, the other only for the annual survey. The maximum sampling weight for an EIN selected for the monthly survey was 800. The maximum sampling weight for an EIN selected for the annual survey was 400.

Sample Maintenance

Periodically, we update the sample to represent EINs issued since the initial sample selection. These new EINs, called births, are EINs recently assigned by the IRS, on the latest available IRS mailing list for FICA taxpayers, and assigned a kind-of-business classification (if possible) by the Social Security Administration (SSA).

EIN births are sampled on a quarterly basis using a two-phase selection procedure. In the first phase, births are stratified by kind of business and a measure of size based on expected employment or quarterly payroll. A relatively large sample is drawn and canvassed to obtain a more reliable measure of size, consisting of sales in two recent months, and a new or more detailed kind-of-business classification.

Using this more reliable information, the selected births from the first phase are subjected to probability proportional-to-size sampling with overall probabilities equivalent to those used in drawing the initial sample from the June 1999 Business Register. Because of the time it takes for a new employer firm to acquire an EIN from the IRS, and because of the time needed to accomplish the two-phase birth-selection procedure, births are added to the sample approximately nine months after they begin operation.

The processing of the EIN births differs between the monthly (MWTS) and annual (ATS) surveys. For the MWTS, EIN births selected in a quarter are added into the survey during the next quarter. Because births are not represented in the monthly sample until they go through the two-phase selection procedure, an interim procedure is used to account for births during the period between the onset of activity and the time of birth selection. This consists of imputing data for all firms in the current sample that have gone out of business but are still on the IRS mailing list.

For the ATS, EIN births that are selected in the quarterly birth-selection procedure in November of the annual survey year are included in the initial mailing of the ATS questionnaires in January of the following year. To better represent all EIN births in the annual survey year, and specifically to account for the time it takes to identify and select new EINs, we add births to the annual sample that are selected in February, May, and August of the year following the annual survey year. We mail survey forms to these births in June and August to supplement the initial annual survey mailing.

To be eligible for the sample canvass and tabulation, an EIN selected in the noncertainty sampling operations must meet both of the following requirements:

- It must be on the latest available IRS mailing list for FICA taxpayers from the previous quarter.

- It must have been selected from either the Business Register or the file of employer births.

EINs selected into the sample with certainty are not dropped from canvass and tabulation if they are no longer on the IRS mailing list. Rather, the business that used the EIN is contacted, and if a successor EIN is found, it is added to the survey. This is a more stringent quality control used for these larger businesses.

Monthly Estimation Procedures

The estimates of monthly sales and end-of-month inventories published in this report are derived from data collected in the Monthly Wholesale Trade Survey. Each month, all firms selected with certainty (sampling weight equal to 1.0) and one of the two groups of noncertainty (sampling weight greater than 1.0) EINs are asked to report their sales and inventory data for the month just ending. (As noted in the **Sample Selection** section, noncertainty EINs are assigned to one of two groups. One group is canvassed for the monthly and annual survey while the other group is canvassed only for the annual survey.) Estimates of monthly sales and end-of-month inventories are computed as the sum of weighted data (reported and imputed) for all selected sampling units that meet the tabulation criteria given in the **Sample Maintenance** section. The weight for a given sampling unit is the reciprocal of its probability of selection into the monthly sample. The monthly estimates are benchmarked using the corresponding annual survey estimates and Economic Census results. See the **Derivation of Published Estimates** section located at the beginning of this report for a description of the benchmarking procedures.

Annual Estimation Procedures

The annual sales, end-of-year inventories, purchases, and gross margin estimates published in this report are derived from the Annual Trade Survey. All firms selected with certainty and both

groups of noncertainty EINs are asked to report data for the previous year. (Two years of data are requested in the year in which a new sample is introduced.) Estimates are computed as the sum of weighted data (reported and imputed) for all selected sampling units that meet the tabulation criteria given in the **Sample Maintenance** section. The weight for a given sampling unit is the reciprocal of its probability of selection into the annual sample. Because both groups of noncertainty EINs are canvassed for the annual survey, the annual estimates have less sampling variability than the corresponding monthly estimates. The annual estimates presented in this report have been adjusted to results of the most recent Economic Census.

The estimates of end-of-year inventory published in this report are on a non-LIFO basis. For those firms that value inventory on a LIFO (last-in, first-out) basis, the LIFO reserve amount is added to the LIFO value to get inventory on a non-LIFO basis. In the Annual Trade Survey, sampling units that used a LIFO cost basis for all or part of their inventory were asked to report LIFO reserves.

The gross margin estimates represent sales less the cost of goods sold (see **Definition of Terms**) and are computed as a function of weighted sales, inventories, and purchases data from the Annual Trade Survey.

RELIABILITY OF THE ESTIMATES

An estimate based on a sample survey potentially contains two types of errors - sampling and nonsampling. Sampling error occurs because only a subset of the entire population is measured in a sample survey. Nonsampling error encompasses all other factors that contribute to the total error of a sample survey estimate. The accuracy of a survey result may be affected by these two types of errors.

Sampling and nonsampling errors are often measured by the quantities, bias and variance. The *bias* of an estimator of an unknown population value is the difference, averaged over all possible samples of the same size and design, between the estimator and the unknown population value. Any systematic error, or inaccuracy that affects all samples of a specified design in a similar way, may bias the resulting estimates. The *variance* of an estimator is the squared difference, averaged over all possible samples of the same size and design, between the estimator and its average value.

Descriptions of sampling and nonsampling errors for the Monthly Wholesale Trade Survey (MWTS) and the Annual Wholesale Trade Survey (ATS) are provided in the following sections.

Sampling Error

Because the estimates are based on a sample, exact agreement with the results that would be obtained from a complete enumeration of merchant wholesale firms represented on the sampling frame is not expected. However, because each firm represented on the sampling frame has a

known probability of being selected into the sample, it is possible to estimate the sampling variability of the survey estimates.

The particular sample used in this survey is one of a large number of samples of the same size that could have been selected using the same design. If all possible samples had been surveyed, under the same conditions, an estimate of an unknown population value could have been obtained from each sample. These samples give rise to a distribution of estimates for the unknown population value. A statistical measure of the variability among these estimates is the standard error, which can be approximated from any one sample. The *standard error* is defined as the square root of the variance. The *coefficient of variation* (or relative standard error) of an estimate is the standard error of the estimator divided by the estimator. Note that measures of sampling variability, such as the standard error and coefficient of variation, are estimated from the sample and are also subject to sampling variability. (Technically, we should refer to the *estimated* standard error or the *estimated* coefficient of variation of an *estimator*. However, for the sake of brevity, we have omitted this detail.) It is important to note that the standard error and coefficient of variation only measure sampling variability. They do not capture any systematic biases in the estimates. Table 3 provides the minimum, maximum, and median coefficients of variation for estimates of monthly sales and end-of-month inventories for each kind of business. The ranges and medians shown in Table 3 are based on *final* MWTS data for January 2001 and February 2001. Coefficients of variation for annual sales, end-of-year inventories, purchases, gross margin, and gross margin-to-sales ratios for each kind of business are provided in Table 4. These coefficients of variation are based on 1999 ATS data, adjusted to results of the 1997 Economic Census. (All coefficients of variation are expressed as percents.)

The estimate from a particular sample and the standard error associated with the estimate can be used to construct a confidence interval. A *confidence interval* is a range about a given estimator that has a specified probability of containing the estimator's corresponding, unknown population value. If, for each possible sample, an estimate of an unknown population value and its approximate standard error were obtained, then:

1. For approximately 90 percent of the possible samples, the interval from 1.65 standard errors below to 1.65 standard errors above the estimate would include the unknown population value.

2. For approximately 95 percent of the possible samples, the interval from two standard errors below to two standard errors above the estimate would include the unknown population value.

To illustrate the computation of a confidence interval for an estimate of total sales, assume that an estimate of total sales is $10,750 million and the coefficient of variation for this estimate is 1.8 percent, or 0.018. First obtain the standard error of the estimate by multiplying the total sales estimate by its coefficient of variation. For this example, multiply $10,750 million by 0.018. This yields a standard error of $193.5 million. The upper and lower bounds of the 90-percent

confidence interval are computed as $10,750 million plus or minus 1.645 times $193.5 million. Consequently, the 90-percent confidence interval is $10,431 million to $11,069 million. If corresponding confidence intervals were constructed for all possible samples of the same size and design, approximately 9 out of 10 (90 percent) of these intervals would contain the results obtained from a complete enumeration.

Nonsampling Errors

Nonsampling error encompasses all other factors that contribute to the total error of a sample survey estimate and may also occur in censuses. It is often helpful to think of nonsampling error as arising from deficiencies or mistakes in the survey process. In the MWTS and the ATS, nonsampling error can be attributed to many sources: inability to obtain information about all firms in the sample; response errors; differences in the interpretation of the questions; mistakes in coding or keying the data obtained; and other errors of collection, response, coverage, and processing. Although no direct measurement of the potential biases due to nonsampling error has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize its influence.

A potential source of bias in the estimates is due to imputing data for nonrespondents and for data which fail edit. (Imputation is the process of replacing a missing value by a predicted value obtained from an appropriate model for nonresponse.) In any given month imputed data amounts to about 33 percent of the total monthly wholesale sales estimate and about 34 percent of the total wholesale end-of-month inventory estimate. For the annual survey, imputed data amounts to about 7 percent of the total wholesale sales estimate, about 12 percent of the total wholesale end-of-year inventory estimate, and nearly 14 percent of the total purchases estimate.

ADJUSTMENT FOR SEASONAL AND TRADING-DAY VARIATION

We use the X-12 ARIMA Program to derive the factors for adjusting data for seasonal variations and, in the case of sales, for trading day differences. Seasonal adjustment of estimates is an approximation based on current and past experiences. Therefore, the adjustment could become less precise because of changes in economic conditions and other elements that introduce significant changes in seasonal and trading-day patterns.

Concurrent seasonal adjustment uses all available unadjusted estimates (including the latest *preliminary* estimates) as input to the X-12 ARIMA program. When unadjusted *preliminary* and final estimates become available, all estimates are used as input to the X-12 ARIMA program and new factors are applied to the *preliminary* and final estimates (1 month before the *preliminary*) and to the previous year estimates that correspond to the *preliminary* month.

SCOPE OF SURVEY

Wholesale trade, as defined by sector 42 of the 1997 North American Industry Classification System manual, as covered in the 1997 Census of Wholesale Trade and 1999 Annual Trade Survey, includes establishments organized to sell or arrange the purchase or sale of a) goods to other wholesalers or retailers, b) capital or durable non-consumer goods, and c) raw and intermediate materials and supplies used in production.

- Wholesalers sell merchandise to other businesses and normally operate from a warehouse or office with a design and location that is not intended to solicit walk-in traffic and with little or no display of merchandise.

- Customers are generally reached initially via telephone, in-person marketing or by specialized advertising.

- Follow-up orders are either vendor-initiated or client-initiated generally based on previous sales, and typically exhibit strong ties between sellers and buyers.

The two principal types of establishments included in wholesale trade are:

a) Merchant wholesalers who take title to the goods they sell such as wholesale merchants or jobbers, drop shippers, import/export merchants and sales branches.
b) Agents, merchandise or commodity brokers, commission merchants, import/export agents and brokers, auction companies and manufacturers representatives.

Kind-of-Business Classifications

The durable goods group includes establishments primarily engaged in the distribution of goods classified in NAICS subsector 421. This group includes all establishments classified in the following categories:

NAICS	Kind of Business
4211	Motor Vehicles and Motor Vehicle Parts and Supplies
4212	Furniture and Home Furnishings
4213	Lumber and Other Construction Materials
4214	Professional and Commercial Equipment and Supplies
42143	Computer and Computer Peripheral Equipment and Software
4215	Metals and Minerals, except Petroleum
4216	Electrical Goods
4217	Hardware, and Plumbing and Heating Equipment and Supplies
4218	Machinery, Equipment, and Supplies
4219	Miscellaneous Durable Goods

For NAICS 4215, the estimated inventories include merchant wholesalers' inventories as well as those of sales branches of ferrous metals service centers. The nondurable goods group includes establishments primarily engaged in the distribution of goods classified in NAICS subsector 422. This group includes all establishments classified in the following categories:

NAICS	Kind of Business
4221	Paper and Paper Products
4222	Drugs and Druggists' Sundries
4223	Apparel, Piece Goods, and Notions
4224	Groceries and Related Products
4225	Farm Product Raw Materials
4226	Chemicals and Allied Products
4227	Petroleum and Petroleum Products
4228	Beer, Wine, and Distilled Alcoholic Beverages
4229	Miscellaneous Nondurable Goods

DEFINITION OF TERMS

Sales. Sales include:

1. merchandise sold for cash or credit at wholesale and retail by establishments primarily engaged in merchant wholesale trade;

2. receipts from customers for rental or leasing of equipment, instruments, tools, etc.;

3. receipts for delivery, installation, alteration, maintenance, repair, storage, and other services; and

4. gasoline, liquor, tobacco, and other excise taxes which are paid by the manufacturer and passed along to the wholesaler.

Sales are net after deductions for refunds and allowances for merchandise returned by customers. Sales which are made on an agency basis for others are included as gross sales. Direct shipments on orders from wholesalers are also included in sales. Total sales do not include non-operating income from such sources as investments, rental or sale of real estate, etc.

Sales exclude sales taxes and excise taxes collected directly from customers and paid directly to a local, State, or Federal tax agency. Also excluded are receipts from customers for carrying or other credit charges.

Inventories. Inventories represent stocks on a non-LIFO basis (firms that valued inventory on a LIFO basis included the values of LIFO reserve in the total inventory levels) of merchandise owned by merchant wholesalers at the end of the month regardless of location except for goods held outside the United States. Goods held on consignment and items not held for sale such as fixtures, equipment, and supplies are not included. Goods held in foreign trade zones in the United States are also included. Methods of valuation may vary according to the accounting practices of the firm.

Inventories/Sales Ratios. The inventories/sales ratios are derived by dividing the dollar value of inventories by the dollar value of sales. No adjustment is made in these ratios for the markup in sales which may vary from trade to trade.

Purchases. Purchases represent the total cost of merchandise acquired for resale during the year, whether or not payment for the merchandise was made during the year. Purchases are net of returns, allowances, and trade and cash discounts but include payments by the wholesaler for freight, insurance, import duties, and credit and other charges. Purchases exclude the cost of containers, wrapping, packaging, and selling supplies. Also excluded are liquor and tobacco tax stamps.

Cost of Goods Sold. Cost of goods sold are not shown in this report but can be derived by subtracting gross margin data from annual sales data. They represent the total cost of merchandise sold for cash or credit at wholesale and retail by establishments primarily engaged in merchant wholesale trade. Cost of goods sold is calculated by adding all purchases of merchandise (net of returns, allowances, and discounts but including charges for freight, insurance, etc.) during the year to the beginning year inventories, then deducting the end-of-year inventories from the total. Firms were instructed to exclude the cost of containers, wrapping, packaging, and selling supplies in the cost of purchases. Purchase of tax stamps and payments of excise taxes often included by tobacco and liquor wholesalers in their purchases were excluded from cost of goods sold.

Gross Margin. Gross margin represents sales less cost of goods sold. Gross margin is equivalent to the cost of all materials (as distinguished from goods to be resold) and services provided in merchant wholesale establishments whether provided by the merchant wholesaling firm itself or purchased by it from others. To the extent that it includes cost of contract work done by others on materials of the merchant wholesale firms, gross margin includes an element of value added by manufacturing.

CLASSIFICATION DIFFERENCES BETWEEN THE MONTHLY SURVEY AND THE 1997 CENSUS OF WHOLESALE TRADE

Establishments in the census that are classified in the Farm Product Raw Materials group (NAICS code 4215) include, in their sales, products purchased and transferred to other company establishments. In the monthly survey, intercompany transfers are not included in sales. Because of these differences, we use estimates from the Annual Trade Survey.

Inventories were not benchmarked to the census inventory levels, because the Census of Wholesale Trade does not include inventories of auxiliary and central administrative offices of merchant wholesale establishments. These offices, however, are included in the monthly and annual survey inventory estimates.